

UNITED STATES PATENT APPLICATION

OF

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FOR

CONTROL PANEL ASSEMBLY

[0001] This application claims the benefit of Korean Application No. 10-2002-0074969 filed on November 29, 2002, which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The present invention relates to a home appliance such as a washing machine, and more particularly, to a control panel assembly of a home appliance provided with an interlocking means to enable a secure attachment of a display panel to a control panel by thermal fusion.

Discussion of the Related Art

[0003] Major home appliances such as washing machines, driers, and dishwashers require a reliable means for the user to control the apparatus. Typically, such control is accessible from the exterior of the apparatus and includes a display panel for displaying operational status and transmitting a manual force of a user through such means as a touch screen, push-button controls, and control knobs and dials. Meanwhile, a home appliance should be aesthetically appealing, including smooth surfaces where possible.

[0004] FIGS. 1 and 2 illustrate a typical washing machine, i.e., a home appliance, provided with a control panel assembly according to a related art.

[0005] Referring to FIG. 1, an inner tub 4, having a pulsator 6 rotatably installed in its bottom, is installed in a case 2 having an entrance 2h. A control panel 120 is provided along a top rear edge of the case 2, adjacent a detergent box assembly 8. Built into the control panel 120 are various electronic components for controlling the operation of the apparatus, including a display device for displaying operational status and controls for transmitting a manual force from the user. The control panel 120 has a forwardly sloping upper surface to

facilitate access and viewing by the user. A display panel 140, fusion-fixed to the upper surface of the control panel 120 so as to largely cover the control panel, consists essentially of a display window 141 for allowing a user to view information displayed by the display device and a plurality of controls 142 for transmitting a manual force as desired by the user.

5 **[0006]** As shown in FIG. 2, the display panel 140 has a curved rearward edge 140b and a sharply bent forward edge formed as a fixing rib 140a for fitting into a fixing recess 120c of the control panel 120. A pair of fusion ribs 120a and 120b are formed on the control panel 120 to protrude upward to confront the forward and rearward edges of the display panel 140, respectively, so that the display panel may be attached to an upper surface of the control
10 panel by a thermal fusion technique using a high-frequency vibration. Hence, the display panel 140 is attached to the upper surface of the control panel 120 at the fusion ribs 120a and 120b, each of which constitute a thin line of contact between the display panel and control panel.

[0007] In the above-described control panel assembly according to the related art,
15 however, the line of contact at the rearward fusion rib 120b tends to fail as the display panel 140 is vibrated to be attached to the control panel 120. As a result, adhesion of the display panel to a control panel is inadequate.

SUMMARY OF THE INVENTION

20 **[0008]** Accordingly, the present invention is directed to a control panel assembly that substantially obviates one or more of the problems due to limitations and disadvantages of the related art.

[0009] An object of the present invention, which has been devised to solve the foregoing problem, lies in providing a control panel assembly of a home appliance, by which

adhesion of a display panel to a control panel is improved by providing a planar contact between the display panel and control panel.

[0010] It is another object of the present invention to provide a control panel assembly of a home appliance, which enables a secure adhesion between a display panel and a control panel regardless of design contours of the home appliance.

[0011] It is another object of the present invention to provide a control panel assembly of a home appliance, which enables a planar contact to be made during a thermal fusion of a display panel to a control panel.

[0012] Additional features and advantages of the invention will be set forth in the description which follows, and in part will be apparent to those having ordinary skill in the art upon examination of the following or may be learned from a practice of the invention. The objectives and other advantages of the invention will be realized and attained by the subject matter particularly pointed out in the specification and claims hereof as well as in the appended drawings.

[0013] To achieve these objects and other advantages in accordance with the present invention, as embodied and broadly described herein, there is provided a control panel assembly of a home appliance. The assembly comprises a control panel having a contour according to a design of the home appliance; and display panel attached to the control panel, wherein a planar contact between the display panel and the control panel is established through a thermal fusion technique. The display panel is provided with a first interlocking means along one edge, and the control panel is provided with a second interlocking means for receiving the first interlocking means. The first interlocking means of the display panel is preferably achieved by a protrusion, and the second interlocking means of the control panel is preferably achieved by a recess. The protrusion and recess each have a cross-section of a

corresponding shape, such as a triangle, to provide the means for interlocking.

[0014] It is to be understood that both the foregoing explanation and the following detailed description of the present invention are exemplary and illustrative and are intended to provide further explanation of the invention as claimed.

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BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain
10 the principle of the invention. In the drawings:

[0016] FIG. 1 is a perspective view of a general washing machine;

[0017] FIG. 2 is a cross-sectional view of a control panel assembly of the washing machine of FIG. 1; and

[0018] FIG. 3 is a cross-sectional view of a control panel assembly according to the
15 present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0019] Reference will now be made in detail to the preferred embodiment of the present invention, examples of which are illustrated in the accompanying drawings.
20 Throughout the drawings, like elements are indicated using the same or similar reference designations where possible.

[0020] Referring to FIG. 3, a control panel assembly according to the present invention is achieved by attaching a display panel 540 to a forwardly sloping upper surface of a control panel 520. Built into the control panel 520 are various electronic components for

controlling the operation of the apparatus, including a display device for displaying operational status and controls for transmitting a manual force from the user.

[0021] The display panel 540 is prepared by printing characters and symbols on an upper surface of an injection-molded fixing panel 542 and attaching a film 541, having a plurality of operational buttons 541a formed thereon, to the upper surface of the fixing panel. As an alternative, an operational film having operational buttons formed thereon and a print film having characters and symbols printed thereon may be attached to the injection-molded fixing panel 542.

[0022] The display panel 540 is formed by injection molding to impart a curved rearward edge 540b according to contours of the design of the apparatus and a fixing rib 540a along its forward edge, to protrude downward to fit into a fixing recess 520c formed in the control panel 520. A fusion rib 520a is formed on the control panel 520, to protrude upward toward the display panel 540 and provide a means for fusion-attachment to the display panel along its forward. The display panel 540 is provided with a fusion protrusion 550a formed along the tip of its rearward edge and having a triangular cross-section for fitting into a fusion recess 550b formed in the control panel 520.

[0023] Thus, the triangular recess of the fusion recess 550b of the control panel 520 is provided in opposition to the triangular protrusion of the fusion protrusion 550a of the display panel 540, to provide interlocking means. As an alternative, the recess may be formed in the display panel 540 such that the protrusion is formed in the control panel 520, and the recess and protrusion may have alternative cross-sectional shapes to provide the interlocking means.

[0024] In assembling the control panel assembly of the present invention, the fixing rib 540a of the display panel 540 is fitted in the fixing recess 520c of the control panel 520. Thus, the planar surface of the forward portion of the display panel 540 makes a planar

contact with the control panel 520 at the fusion rib 520a. In doing so, the fusion protrusion 550a of the display panel 540 is inserted into the fusion recess 550b of the control panel 520, such that a planar contact is established despite the designed shape of the curved rearward edge 540b of the display panel. The display panel 540 is then vibrated to be attached to the control panel 520 by thermal fusion. The planar contact between the display panel 540 and control panel 520 enables an increased adhesion intensity of the display panel to the control panel.

[0025] Accordingly, regardless of the contours of a control panel of a home appliance, the control panel assembly according to the present invention achieves a secure adhesion between a display panel and the control panel.

[0026] It will be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover such modifications and variations, provided they come within the scope of the appended claims and their equivalents.